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# CINNAMOMUM MALABATRUM: REVIEW

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**ABSTRACT**

Cinnamon (Cinnamomum malabatrum), the eternal tree of medical science belongs to the Lauraceae family. Cinnamon is one in every of the foremost important spices used daily by people everywhere in the world. Cinnamon primarily contains vital oils and other chemical constituents like Cinnamaldehyde, Cinnamic acid, Cinnamate. These constituents are used in different kinds of diseases they also producing cardiovascular disease lowering compound, used as antioxidant, anti-inflammatory, antidiabetic, antimicrobial, anticancer, lipid-lowering agent, and cardiovascular-disease-lowering compound, cinnamon has also been reported to have activities against cancer, like Parkinson's and Alzheimer's disease. Conclusion: This review illustrates the importance and scoe for the future study of Cinnamomum malabatrum as potential medicinal plant

## INTRODUCTION

The *Cinnamomum* spp. are important spices that are used for various purposes in different parts of the world. The genus *Cinnamomum* comprises approximately 250 species that are distributed in the Asian and Australian continents [1], which 26 are found in India[2] Among the different species of the *Cinnamomum* genus, the *C. malabatrum* (Burm.f.) J.Presl is an endemic medicinal plant that belongs to the Western Ghats, Kerala, India. Limited studies are available on the essential oil of the plant. Cinnamomum malabatrum is also called as wild cinnamon, country cinnamon and as malabathrum, it belongs to the family Lauraceae, that is endemic to western ghats of India. It can grow up to 15m (49ft) tall. It has aromatic leaves are used for culinary and medicinal purpose. It is thought to have been one of the major sources of the medicinal plant leaves known in classical and medieval times as malabathrum (or malobathrum).

**Fig 1. Leaf of Cinnamomum malabatrum**

Malabar is traditionally used to denote the west coast of southern India forms the present-day state of Kerala and adjoining areas. The word mala or Malaya means -a mountain in the languages Tamil and Malayalam and Sanskrit. The word ‘malabathrum’ is thought to have

been derived from the Sanskrit tamālapattram, literally meaning "dark-tree leaves".

**TAXONOMY:**

Botanical name – Cinnamomum malabatrum
Kingdom - Plantae
Clade: Tracheophytes
Clade: Angiosperms
Clade: angolides
Division - Magnoliophyta
Class - Magnoliopsida
Order – Laurales
Family - Lauraceae
Genus – Cinnamomum
Species: C.malabatrum
Binomial name: Cinnamomum
VERNACULAR NAMES
English - Country Cinnamon
Hindi - JangliDalchini
Marathi – Dalchinitiki
Tamil - Kattu-karuvappattai
Telugu - Adavilavangapatta
Sanskrit – Tejpatra
Persian - Sazaj-i-Hindi
Malayalam – Karuntoli

**MORPHOLOGICAL DESCRIPTION:**

Morphological descriptions outlined in floras[3,4] are used as a guideline to propose diagnostic differentiating macro-microscopic characters of the official source of Tamalapatra. Macroscopic and sensory characters of the leaf were studied.

Macroscopic and organoleptic characters of leaves of C. malabatrum:

Size whole leaf (cm) :15-30 × 5-10
petiole (mm)shape : 5-20 Elliptic to oblong or elliptic lanceolate.
Base :Acute
Tip :Acuminate
Texture Gabrous above, smooth and shining below
Venation: Lateral nerves reaching to the tip, outer pair arising from the base or slightly above the base; sometimes obliquely placed
Petiole: Highly corrugated, glabrous, upper surface centrally grooved.
Color: Yellowish-green above, pale below
Taste: Mucilaginous, slightly astringent
Odor :Fragrant

Microscopic characters of the transverse section of petiole of C. malabatrum (Fig 2a):

Outline :Broadly ovate, with a number of winged projections and a depression on the upper side.
Hair: Rare, simple uni to bi-cellular, thick walled, pearl gland absent.
Epidermis: Thick walled, lignified, without any papilla
Pericycle: Surrounded by stone cells and discontinuous groups of sclerenchyma Non-lignified group of sclerenchyma
Phloem: Three patches of phloem in the lower side shows few lignified fibers and sieve tubes
Xylem: 50-60 radial rows of vessels, each row with 2-14 vessels

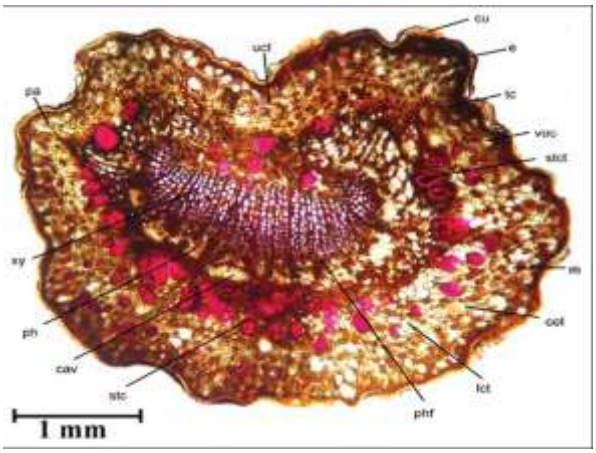


**Figure 2a: Microscopic characters of leaf of Cinnamomum malabatrum.**

Detailed transverse section of petiole cav: Cavity, col: Collenchyma, cu: Cuticle, e: Epidermis, lct: Lower cortex, m: Mucilage, pa: Parenchyma, ph: Phloem, phf: Phloem fiber, stc: Stone cell, stct: Stone cell with tannin, tc: Tannin cell, uct: Upper cortex, voc: Volatile oil cell, xy: Xylem. Phloroglucinol and HCl staining. Microscopic characters of the transverse section of midrib of C. malabatrum (Fig:2b) Upper elevation :Small, conical shaped Lower elevation: Broad, not winged
Upper epidermis: Thick walled cells covered by thick cuticle, hairs Lower epidermis: Thick walled, lignified cells with scanty bent unicellular and thick walled trichomes, epidermal cells not papillose

Palisade :Single layered, oval or spherical cells containing mucilage found embedded between the cells, volatile oil cells less often
Spongy: 5-6 layers of loosely arranged chlorenchyma. Sclerenchyma traversing in mesophyll: About 2-4 cells wide, 20 cells high, 15-25 palisade cells in between such traversions Stomata:Anomocytic

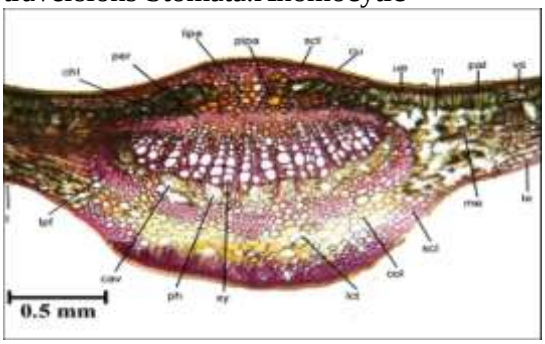


**Figure 2b: Microscopic characters of leaf of Cinnamomum malabatrum.**

Detailed transverse section of leaf passing through midrib. cav: Cavity, chl: Chlorenchyma, col: Collenchyma, cu: Cuticle, e: Epidermis, le: Lower epidermis, lct: Lower cortex, lipa: Lignified parenchyma, lpf: Lignified pericyclic fiber, m: Mucilage, me: Mesophyll, pal: Palisade, per: Pericycle, ph: Phloem, pipa: Pitted parenchyma, scl: Sclerenchyma, t: Trichome, ue: Upper epidermis, vs: Vascular strands, xy: Xylem. Phloroglucinol and HCl staining

**Microscopy of macerated leaf:** Leaf on maceration yielded information on different tissue system from the petiole and lamina, the inference is found to be more informative in differentiating the two species. The characters observed are illustrated in Figure 3.

**Figure 3: Microscopy of macerated leaf of Cinnamomum malabatrum.**

(a) Epidermis of petiole; (b) Trichome; (c) Parenchyma with calcium oxalate crystals; (d) Mucilage cells; (e) Upper and lower epidermis; (f) Small stone cells; (g) Tannin cell; (h) Large sclereid; (i) Stone cells; (j) Tracheidal fibers; (k) Pitted and non-pitted fibers; (l) Thin-walled sclereids of different types; (m) Transversely cut lamina; (n) Annular tracheid; (o) Septate fiber; (p) Reticulate and pitted vessels; (q) Porous thick-walled fiber; (r) Thick-walled short fiber; (s) Sclereidal fibers; (t) Long fibre

**CHEMICAL CONSTITUENTS:**

Cinnamomum malabatrum leaves contain chemical composition of cinnamic aldehyde, eugenol, β-caryophyllene, benzaldehyde, camphor, cadinene, α-terpinol, limonene, geraniol, eugenol acetate, ocimene8 , γ-terpinene, benzyl cinnamate, β-phellandrene and benzyl acetate. The oil from bark contains cinnamaldehydes (70-85%) as a big constituents. The plant also contain 3,4‘,5,7-tetra hydroxyl flavones, 3,3‘,4‘,5,7-pentahydroxy flavones, kaempferol-3-Osophoroside and quercetin 3-O- rutin.[5] The constituents of the essential oils of leaf, petiole, shoot and terminal shoot of Cinnamomum malabatrum were determined by GC and GC– MS.5] 39 compounds, constituting 95% of the oil, were identified in the leaves. Major chemical constituents of the leaf oil were Caryophyllene (28.6%), Cinnamyl acetate (15.1%), Bicyclogermacrene (14.4%) and Benzyl benzoate (8.5%). 28 compounds, representing 98% and 97% of the oil, were identified in the petioles and shoots, respectively, whereas in the oil of the terminal shoots 34 compounds, accounting for 97%, were identified[6]. The essential oils of the petiols, shoots and terminal shoots were dominated by linalool (77.8-79.4%). Later, a study by Sriramavaratharajan and Murugan [7] reported the predominant compounds as β-Phellandrene (12.0%) and linalool (15.4%).
Koppala Narayana Sunil Kumar et al - evaluated Chemical identity of C. Malabatrum was established in comparison with the official drug. Leaves of C. Malabatrum showed marked distinction in physicochemical and volatile oil composition which will serve as

markers to differentiate it from C. tamala; the official source of tamalapatra. Though Though physic chemical constants will serve the purpose of standardization, volatile oil composition was found to be a diagnostic test for the differentiation of was found to C. Malabatrum from C. Tamala.[13]

**MEDICINAL USES: [8-12]**

The essential oil obtained from the leaves has been shown to be antibacterial and antifungal. The leaves are carminative. They are used in the treatment of colic and rheumatism. They are sweetish and heating, making them useful in vata, scabies, disease of the anus and rectum, tridosha, piles and heart troubles.An ethanol extraction of the leaves has shown significant anti-inflammatory activity and can be used in the treatment of acute inflammation.[14] Cinnamon primarily contains vital oils and other chemical constituents like Cinnamaldehyde, Cinnamic acid, Cinnamate. These constituents are used in different kinds of diseases they also producing cardiovascular disease lowering compound, used as antioxidant, antidiabetic, antimicrobial, anticancer, lipid-lowering agent, and cardiovascular-disease-lowering compound, cinnamon has also been reported to have activities against cancer, like Parkinson's and Alzheimer's disease[15].

**Antihyperlipidemic activity:**

Natarajan P et al., (2014)[16] reported that, The Cinnamomummalabatrum extract showed significant decrease in levels of TC, TGs, LDL, VLDL and a significant increase in HDL cholesterol. They also reduced the atherogenic index (A.I) and LDL/HDL ratio when compared to hyperlipidemic control group. Atorvastatin and Cinnamomummalabatrum leaf extract resulted in significant increase in the antioxidant enzymes activities and GSH contents in liver and heart homogenate. Alcoholic extract of Cinnamomum malabatrum produced significant increase in HMG Co-A / mevalonate ratio in liver as compared to normal group shows that it blocks the HMG Co-A reductase activity. The phytochemical screening reveals the presence of many components responsible for its antioxidant and hypolipidemic activity which includes phenolics, flavinoids, saponins and the pharmacological effects may be due to its presence.

**Anti inflammatory activity:**

Aravind.R et al (2013) [17] evaluated anti-inflammatory activity of Cinnamomummalabatrum by Carrageenan induced rat paw oedema model, using a Plethysmometer. and male Wistar albino rats was used for carrying this work. The paw volume was measured at 1,2,3,4 hours after 1 hour of Carragenan(a well knownPhlogistic agent) administration by mercury displacement method using plethysmograph. The change in the paw volume was observed and it is recorded, and the percentage of inhibition was calculated by using a specified formula. The alcoholic extract showed significant anti-inflammatory activity. The Ethanolic extract at a dose of 250mg/kg exhibit maximum anti-significant dose depended antiinflammatory activity. The pharmacological observations of the study concluded that the leaves of Cinnamomummalabatrum can be used for acute inflammation.

**Anti cancer activity:**

Muthuramkumar S et al.,(2016) [18] The ethyl acetate crude extract showed in vitro cytotoxicity against the HeLa, MCF-7 and MG63 cancer cell lines with the IC50 values of 94.2µg/ml, 84.3µg/ml and 162µg/ml respectively. Gas chromatography and Mass Spectrophotometry (GC-MS) analysis of crude extract confirmed that CMS 3 was a prolific producer of secondary metabolites, in which nearly 74% of the metabolites not listed in the NIST database. Major compounds were phenol 3, 5- dimethoxy acetate (11.82 %), 4'-isopropylidene-bis-(2-cyclohexyl) phenol, NDidehydrohexacarboxyl-2, 4, 5-trimethylpiperazine and 1, 2, 4-Triazolium ylide. These metabolites may be responsible for its antimicrobial and cytotoxic activities.

Sorabh KA et al-(2013) reported the anticancer effect of Cinnamomummalabatrum on Daltons Lymphoma Ascites (DLA) cell lines. Aqueous and alcoholic extracts (625 mg/kg and 500

mg/kg b wt) were tested in DLA induced albino male rats. Parameters such as solid tumour volume, peritoneal cell count and body weights were measured. Both the extracts showed a significant reduction in decreasing the solid tumour volume, an increase in peritoneal cell count, and body cell weight. In conclusion, the Cinnamomummalabatrum bark shows good anticancer activity.

**Anti oxidant activity:**

Arunakasharan Narayanakutty (2023) [19] reported the antioxidant, enzymatic and antibacterial activites of *Cinnamomum malabatrum*, They evaluated the chemical composition by a GC-MS analysis and antioxidant properties of the essential oil from *C. malabatrum* (CMEO). Further, the pharmacological effects were determined as radical quenching, enzyme inhibition and antibacterial activity. The results of the GC-MS analysis indicated the presence of 38.26 % of linalool and 12.43% of caryophyllene in the essential oil. Furthermore, the benzyl benzoate (9.60%), eugenol (8.75%), cinnamaldehyde (7.01%) and humulene (5.32%) were also present in the essential oil. The antioxidant activity was indicated by radical quenching properties, ferric-reducing potential and lipid peroxidation inhibition ex vivo. Further, the enzyme-inhibitory potential was confirmed against the enzymes involved in diabetes and diabetic complications. The results also indicated the antibacterial activity of these essential oils against different Gram-positive and Gram-negative bacteria. The disc diffusion method and minimum inhibitory concentration analysis revealed a higher antibacterial potential for *C. malabatrum* essential oil.

**Antidiarrhoeal activity:**

Amresh et al -evaluated the antidiarrhoeal activity of Cinnamomum tamala leaves extract. The hydroalcoholic extract (50-200mg/kg, p.o.) of Cinnamomumtamala exhibited dose dependent increase within the entire number of feces (control 70, reduced to 29- 49) and 30.7 – 57.9 percentage inhibition is cathartic induced diarrhoea in rats. However, Cinnamomum tamala significantly reduced the lipid peroxidation and inhibited the decrease in antioxidant enzymes levels (superoxide dismutase and catalase) in gut on prior administration to cathartic induced fluid accumulation.

**Anti dermatophytic activity:**

Yadav et al studied the anti dermatophytic activity of oil of Cinnamomum as herbal ointment for the cure of dermatomycosis. The oil of Cinnamomum tamala was found to exhibit absolute antidermatophytic activity against two ring worm fungi viz. Microsporum audouinii and Trichophyton mentagrophytes. The ointment of oil prepared in polyethylene glycol showed pronounced efficacy as herbal agent in cure of induced dermatomycosis of guinea pigs.

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